

Remarks

The Applicants have amended Claims 23 – 25 to place them into better form for allowance.

The amendments are merely ministerial in nature and have no effect on the scope of the subject matter claimed therein.

The Applicants acknowledge the rejection of Claims 23 – 25 under 35 U.S.C. §103 over the hypothetical combination of JP ‘336 with Chou. In that regard, the Applicants note with appreciation the Examiner’s detailed and helpful comments concerning the theoretical application of the references against the claims and the manner in which the references are combined. The Applicants respectfully submit that Claims 23 – 25 are allowable over the references, whether taken individually or collectively, for the reasons set forth in detail below.

Chou relates to bake-hardening cold-rolled steel sheet having a dual-phase structure (austenite and martensite). The Applicants first note that the elements concerning compositional structure mentioned below are not disclosed in Chou:

(1) N/Al>0.3.

Also, there are no examples in Chou that satisfy the composing element (1). The mechanism of increasing TS in this invention is believed to be as follows. A large number of dislocations is introduced into a steel sheet by press forming. N in a solid soluted state (dissolved N) is accumulated on the periphery of the dislocation and prevents movement of the dislocation. As a result, the steel sheet is hardened. To effectively achieve this effect, an appropriate amount of dissolved N is necessary to remain in the steel.

Al, by mutual operations with N, precipitates as AlN in the processes of hot rolling, annealing, and so forth and plays a role in reducing N in a solid soluted state. In addition to this, Al has the effect of accelerating the precipitation rate of AlN. Therefore, to have dissolved N remain in

an appropriate amount, the quantitative relationship between Al and N has to be strictly controlled. The effectuation of N/Al shown in the composing element (1) brings about the dual effects of not only making the amount of N excessive, but also lowers the precipitation rate of AlN. This is extremely consequential in making dissolved N easily remain. Thus, excellent formability, strain age hardenability and aging property at room temperature of Claims 23 - 25 are unable to be achieved with Chou.

Further, the manufacturing process after hot rolling according to Chou is quite separate from that of Claims 23 - 25. The following is the manufacturing process after hot rolling according to Chou:

Hot rolling – (pickling) – cold rolling – continuous annealing.

Two separate times of annealing is indispensable in Claims 23 - 25, wherein the aggregate structure is controlled at the first annealing and, subsequently, a compound structure is formed at the second annealing, which is continuous annealing (or continuous hot-dip plating), whereby excellent formability is achieved.

As mentioned above, two separate times of annealing is indispensable in Claims 23 - 25 and, in the meantime, according to Chou, the process of annealing is defined as one time annealing for the purpose of performing recrystallization. Because a process of annealing for controlling the aggregate structure is not disclosed, taught or suggested in Chou, it is not possible to obtain a high r value as in Claims 23 - 25. Chou does not disclose, teach or suggest at all an improvement in the r value and strain age hardenability, which are important requirements of Claims 23 - 25.

What this means is that Chou, as noted by the Examiner, discloses the possibility of continuous annealing or box-annealing. The purpose for such annealing is to cause recrystallization, whether by continuous annealing or box-annealing. There are utterly no teachings or suggestions to

provide both. There is utterly no suggestion in Chou that the first claimed annealing in Claims 23 - 25 controls the aggregate structure and that the second claimed annealing forms the compound structure that results in excellent formability. Careful scrutiny of Chou reveals that he simply has no appreciation for the possibility, much less provides teachings or suggestions to one of ordinary skill in the art that would allow such a person to have any reasonable expectation of such a result.

In fact, the Applicants respectfully submit that Chou essentially teaches that both box-annealing and continuous annealing are equivalents. As such, Chou is utterly devoid of teachings or suggestions that would cause one of ordinary skill in the art to essentially “double up” on the annealing. One of ordinary skill in the art would naturally consider this to be a redundancy and might have good reason to believe that there could be detrimental effects associated with the second annealing that could very well destroy the positive effects achieved by the initial annealing.

Thus, the Applicants essentially agree with the Official Action that both box-annealing and continuous annealing are known in the art and “can be used interchangeably.” However, just because they can be used interchangeably, this in no way means that there is a suggestion that both be employed in the same process. In sharp contrast, the Applicants surprisingly found that the first annealing controls the aggregate structure and the second annealing forms the compound structure, the result being the achievement of excellent formability. This is simply not taught or suggested by Chou.

JP ‘336 relates to a method for manufacturing an extra-thin steel sheet for welded cans having excellent flanging properties. Such sheets are utterly different from sheets of Claims 23 – 25 and from Chou. Thus, one of ordinary skill in the art would have no incentive to combine the teachings of JP ‘336 with Chou.

Nonetheless, even if one of ordinary skill in the art were to make the hypothetical combination, the resulting combination would still fail to teach or suggest the subject matter of Claims 23 – 25. In fact, the Applicants respectfully submit that JP ‘336 has no more disclosure to contribute to the disclosure of Chou than is already disclosed by Chou. As noted above, Chou discloses both box-annealing and continuous annealing as possible alternatives to one another. JP ‘336 does essentially the same.

JP ‘336 also fails to disclose the claimed aspect as mentioned above with respect to Chou concerning the N/Al>0.3 element. This is an important distinction that, even when combined with the failure to disclose that ratio in Chou, fails to provide a specifically recited aspect of Claims 23 – 25. On this basis alone, the Applicants respectfully submit that Claims 23 – 25 are allowable over the hypothetical combination. Moreover, the Applicants have already established above with respect to Chou that the ratio is important in achieving the proper amount of dissolved N.

JP ‘336 also discloses a very different manufacturing process after hot rolling. That process is as follows:

Hot rolling – pickling – cold rolling – continuous annealing or box annealing – secondary cold rolling – plating.

By contrast, the following is the manufacturing process after hot rolling according to Claims 23 – 25:

Hot rolling – pickling – cold rolling – box annealing – continuous annealing or continuous hot-dip plating.

The above steps show the differences between Claims 23 – 25 and JP ‘336. Even more importantly, the two processes set forth below are first the process of Chou and the second process is the process of JP ‘336:

Hot rolling – (pickling) – cold rolling – continuous annealing,

Hot rolling – pickling – cold rolling – continuous annealing or box annealing – secondary cold rolling – plating.

This shows that, even when combined, there is utterly no suggestion to those of ordinary skill in the art to have two separate annealing steps. There is either continuous annealing or box-annealing, but utterly no suggestion that both occur. The fact that continuous annealing and box-annealing may be interchangeable has nothing to do with teachings or suggestions that both steps be applied. Neither reference has one word of disclosure that suggests to one of ordinary skill in the art that such a modification be made to either reference and that there be a reasonable expectation of success if such a modification were to be made. In fact, as mentioned above, those of ordinary skill in the art might very well suspect that application of the second annealing step could likely undo the positive effects achieved in the first annealing step. The Applicants therefore respectfully submit that Claims 23 – 25 are patentable over the hypothetical combination of JP ‘336 with Chou. Withdrawal of the rejection is respectfully requested.

The Applicants acknowledge the rejection of Claims 23 – 25 under 35 U.S.C. §103 over the hypothetical combination of Chou with JP ‘229. The Applicants respectfully submit that Claims 23 – 25 are patentable over the hypothetical combination. The reasons for this are, in this case, quite simple. The Applicants have already established above that Chou fails to teach or suggest the composing element (1) wherein the N/Al ratio is 0.30 or more. Chou utterly fails to teach or suggest this.

JP ‘229 discloses a method for manufacturing a high tensile cold-rolled steel plate of superior drawability and shapeability. The composing element (1) with respect to $N/Al > 0.3$ is not disclosed in JP ‘229. There is also no examples in JP ‘229 satisfying the composing element (1). Thus, for the

same reason set forth above with respect to Chou, excellent formability, strain age hardenability and aging property at room temperature of the subject matter of Claims 23 – 25 are unable to be achieved with JP ‘229. In addition, JP ‘229 provides no suggestion for improving strain age hardenability, which is a critical requirement of Claims 23 – 25. It is therefore impossible even for the skilled practitioner to conceive of the subject matter of Claims 23 – 25 from JP ‘229, wherein the composing elements of composition are different.

The Applicants therefore respectfully submit that, in view of the failure of Chou to disclose, teach or suggest composing element (1) and the failure of JP ‘229 to disclose, teach or suggest composing element (1), the Applicants respectfully submit that, even if one of ordinary skill in the art were to make the hypothetical combination of the teachings of the two references, the resulting methodology will still fail to teach or suggest utilizing a steel composition in the process of Claims 23 – 25 that requires that N/Al is 0.30 or more. As a consequence, the Applicants respectfully submit that Claims 23 – 25 are allowable over the combination. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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